

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A hemming apparatus for hemming an outer skin and inner panel together, the apparatus comprising:

an anvil for supporting an associated assembly comprising an outer skin and an inner panel, the anvil has a supporting surface and a sloped side;

an upper body; and

a steel hem blade mounted to the upper body ~~for movement and pivotally movable~~ between first and second operative positions, the steel hem blade having a first angled surface ~~for prehemming that prehems~~ the associated assembly when the steel hem blade is in the first operative position and a second angled surface ~~for full-hemming that full-hems~~ the associated assembly when the steel hem blade is in the second operative position, the sloped side of the anvil contacts and moves the hem blade from the first operative position to the second operative position.

A27

2. (Cancelled).

3. (Currently Amended) The apparatus of claim [[2]] 1 wherein the first angled surface of the steel hem blade is defined at substantially the same angle as the sloped side of the anvil.

4. (Currently Amended) The apparatus of claim 3 wherein the second angled surface of the steel ~~is defined to~~ hem blade lies parallel to the horizontal supporting surface of the anvil when the steel hem blade is in its the second operative position.

5. (Currently Amended) The apparatus of claim 1 further comprising:
a cam fixedly secured adjacent surface defined by the anvil; and
a cam roller operatively secured to the steel hem blade, the cam roller engaging
the cam surface and moving the steel hem blade from the first operative position to the
second operative position when the steel hem blade is moved adjacent the anvil.

6. (Canceled).

7. (Currently Amended) The apparatus of claim 1 further comprising:
a bias means for urging the steel to hem blade toward the first operative position.

a 27
8. (Original) The apparatus of claim 7 wherein the bias means is a spring.

9. (Currently Amended) The apparatus of claim 1 wherein the steel hem blade includes an indented radius along an intersecting edge of the first and second angled surfaces, the radius providing appropriately sized to provide clearance between
the steel hem blade and the assembly when the steel hem blade transitions from the
first to the second operative position.

10. (Canceled).

11. (Currently Amended) A hemming apparatus for hemming panels together,
the apparatus comprising:

an anvil including a support surface adapted for supporting an assembly that
includes first and second adjacent panels to be hemmed, the first panel including a
peripheral flange projecting away from the anvil support surface and the second panel
including a peripheral edge placed adjacent the flange;

an upper body, at least one of said anvil and said upper body movable toward
the other;

a hemming steel blade connected to the upper body and adapted for movement between first and second operative positions, the hemming steel blade defining a prehemming surface and a hemming surface angled at respective first and second angles relative to the anvil support surface whereby, upon movement of the upper body and the anvil together, the prehemming steel surface contacts and deforms the flange, and upon continued movement of the upper body and anvil together the steel hemming blade pivotally moves about a single pivot point on the upper body to the second operative position so that the second, full-hemming surface engages the deformed flange and moves the deformed flange into close abutment with the second panel.

A27
12. (Currently Amended) The apparatus of claim 11 further comprising:
a bias means for urging the steel hemming blade to the first operative position.

13. (Original) The apparatus of claim 12 wherein the bias means is a spring.

14. (Currently Amended) The apparatus of claim 11 wherein the anvil includes a sloped surface adjacent the support surface ~~for contacting that contacts~~ and ~~moving~~ moves the steel hemming blade from the first operative position to the second operative position when the anvil and the upper body move together.

15. (Currently Amended) The apparatus of claim 11 wherein the steel hemming blade is only pivotally connected to the upper body and adapted to pivot between the first and second operative positions.

16. (Currently Amended) The apparatus of claim 15 wherein the steel hemming blade is forced to pivot from the first position to the second position when the steel hemming blade engages the sloped surface of the anvil.

17. (Currently Amended) The apparatus of claim 11 wherein an adhesive is applied between the peripheral flange and the peripheral edge ~~prior to full hemming after the flange is in close abutment with the second panel.~~

18. (Currently Amended) A method for hemming an outer skin and inner panel together, the method comprising the steps of:

placing an assembly on a supporting surface of an anvil having a sloped surface, the assembly comprising an inner panel positioned on an outer skin, the inner panel having a peripheral edge and the outer skin having a peripheral flange;

moving a hemming steel blade, while in a first operative position, in a first direction into the peripheral flange of the outer skin so that an angled prehemming surface of the steel hemming blade deforms the flange toward the inner panel thereby prehemming the assembly;

A27
~~moving the hemming steel to a second operative position and moving the hemming steel blade further in the first direction into the deformed peripheral flange and simultaneously pivotally moving the hemming blade to the second operative position by the sloped surface engaging the hemming blade and causing the hemming blade to move from the first operative position to the second operative position when the hemming blade is moved in the first direction after prehemming so that a hemming surface distinct from said prehemming surface of the steel hemming blade engages the deformed flange and moves [[it]] said flange into close contact with the inner panel thereby full-hemming the assembly.~~

moving the steel hemming blade away from the hemmed assembly; and
removing the finished assembly from the supporting surface.

19. (Currently Amended) The method of claim 18 wherein the peripheral flange of the outer panel is upstanding and the peripheral edge of the inner panel is flat, both relative to the supporting surface and prior to any contact by the steel hemming blade.

20. (Cancelled).

21. (Currently Amended) The method of claim 18 further comprising:
applying an adhesive to at least one of the inner panel and the outer skin in the
region of the peripheral edge and the peripheral flange, respectively.

22. (Currently Amended) The method of claim [[20]] 18 wherein the
prehemming occurs substantially simultaneously with the steel hemming blade moving
toward and engaging the sloped side of the anvil.

23. (Currently Amended) The method of claim 18 wherein movement of the
steel hemming blade from the first operative position to a second operative position is
completed during a single stroke of the steel hemming blade in the first direction.
A21

24. (Original) The method of claim 23 wherein the single stroke is continuous
and uninterrupted.

25. (Currently Amended) A hemming method comprising:
providing a first sheet metal panel including a first surface and an upturned
flange that projects outwardly away from the first surface;
placing a second surface of a second sheet metal panel in abutment with the first
surface, with an edge of the second sheet metal panel adjacent the upturned flange, the
first and second sheet metal panels together defining a sheet metal assembly;
supporting the assembly on a support surface;
providing a hemming tool with a prehemming surface inclined at a first angle
relative to the support surface and a full-hemming surface inclined at a second angle
relative the support surface, the prehemming surface and the full-hemming surface
together forming a concave work surface wherein the angle between the prehemming
surface and the full-hemming surface is less than 180 degrees when measured on the
side of the working surface;

moving the hemming tool in a first direction to a prehemming location so that the prehemming surface of the tool contacts and deforms the flange toward the first and second sheet metal panels;

moving the hemming tool angularly relative to the support surface so that the full-hemming surface of the hemming tool is operatively positioned relative to the deformed flange; and

moving the hemming tool from the prehemming location further in the first direction to a full-hemming position so that the full-hemming surface of the hemming tool contacts and moves the deformed flange into close abutment and wrapping engagement with the second sheet metal panel.

A27
26. (Original) The hemming method of claim 25 wherein the steps of moving the hemming tool in the first direction to the prehemming location and moving the hemming tool in the first direction to a full-hemming location are effected by a single movement of the hemming tool in the first direction.

27. (Original) The hemming method of claim 25 wherein the step of moving the hemming tool angularly results from the step of moving the hemming tool in the first direction from the prehemming location to the full-hemming location when the hemming tool contacts and engages at least one of the support surface and a fixed member adjacent the support surface.

28. (Currently Amended) A method for hemming an outer skin and inner panel of a motor vehicle assembly together, the method comprising the steps of:

placing an assembly on a supporting surface of an anvil, the assembly comprising an inner panel positioned on the an outer skin, the inner panel having a peripheral edge and the outer skin having a peripheral flange;

moving a steel hemming die in a single stroke into the peripheral flange of the outer skin and the peripheral edge of the inner panel thereby hemming the assembly, the steel hemming die having a first angled surface for effecting a prehem and a second

angled surface for effecting a full-hem, wherein the steel hemming die pivotally moves about a single axis fixed on an upper body to which the hemming die is mounted from a first prehem position to a second full-hem position during the single stroke to align the first and second angled surfaces with the assembly sequentially;

removing the steel from the hemmed assembly; and

removing the finished assembly from the supporting surface.

A27
29. (New) The apparatus of claim 1 wherein the hem blade is connected to the upper body without any links.
